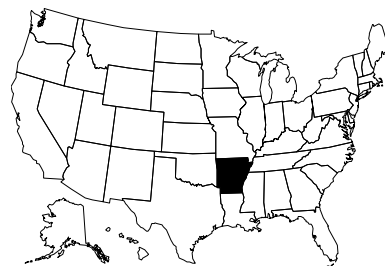


ARKANSAS

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Program Description

As part of the Water Division of the Arkansas Department of Environmental Quality (ADEQ), the Water Quality Planning Branch has seven biologists/ecologists and two geologists on staff. This branch deals with a variety of issues related to water quality monitoring, standards development, and groundwater and wastewater allocations. The Branch is responsible for conducting water quality surveys, assessing the State's water quality for surface and ground water, and 305(b) reporting. The Branch is also responsible for the development of water quality and biological criteria for water quality use attainability analysis and for water quality standards development. In addition, the Branch is responsible for developing TMDLs (303d) for those waters not meeting water quality standards. Finally, the Branch is responsible for the biomonitoring aspect of the NPDES program.

Biological and habitat monitoring are currently restricted to special project needs associated with synoptic watershed surveys or for the development of additional data to support the establishment of biological criteria. For the 2000 305(b) report, portions of 106 stream segments from 17 planning segments were assessed for aquatic life use support using biological communities. These stream segments were either located above or below a point source discharge, or were part of intensive water quality surveys. Survey objectives were to determine the impacts of the discharge, evaluate the biological community in ecoregional reference streams, determine use attainment in previously listed water bodies of concern or those waters not currently meeting all designated uses.

Macroinvertebrates were collected and evaluated following EPA's *Rapid Bioassessment Protocols* (USEPA 1989). Habitat considerations were used in the evaluation of the macroinvertebrate communities through percent comparability evaluation techniques at all sites. An upstream-downstream comparison of the communities, and a comparison of the community to a least disturbed reference stream were also used to make the assessments. Fish communities were analyzed following EPA's *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analysis* (USEPA 1983). Direct comparisons were made with ecoregional fish community data outlined in the Department's *Physical, Chemical, and Biological Characteristics of Least-Disturbed Reference Streams in Arkansas' Ecoregions, 1987*. In addition, an upstream-downstream comparison of the communities was made and compared to a least-disturbed reference stream.

Documentation and Further Information

Water Quality Inventory Report 2000, 305(b) Report:
[http://www.adeq.state.ar.us/water/pdfs/documents/305\(b\)_2000.pdf](http://www.adeq.state.ar.us/water/pdfs/documents/305(b)_2000.pdf)

2002 Proposed 303(d) List: [http://www.adeq.state.ar.us/water/pdfs/documents/303\(d\)_list_proposed_020426.pdf](http://www.adeq.state.ar.us/water/pdfs/documents/303(d)_list_proposed_020426.pdf)

1998 Arkansas 303(d) List: <http://www.adeq.state.ar.us/water/303drprt.htm>

Water Quality Standards for Surface Waters, effective Feb. 1998, amended January 2001:
http://www.adeq.state.ar.us/regs/files/reg02_final_010917.pdf

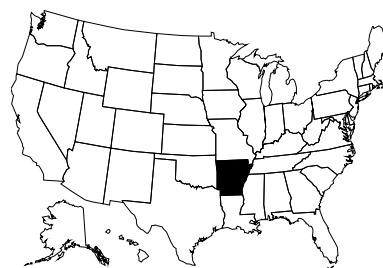
Physical, Chemical, and Biological Characteristics of Least-Disturbed Reference Streams in Arkansas' Ecoregions, Volume 1: Data Compilation, and Volume 2: Data Analysis. ADEQ Water Division. 1987.

Water Quality Planning Branch, list of publications: <http://www.adeq.state.ar.us/water/pdfs/documents/publist.pdf>

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Programmatic Elements

Uses of bioassessment within overall water quality program	<input checked="" type="checkbox"/>	problem identification (screening)
	<input checked="" type="checkbox"/>	nonpoint source assessments
	<input checked="" type="checkbox"/>	monitoring the effectiveness of BMPs
	<input checked="" type="checkbox"/>	ALU determinations/ambient monitoring
	<input checked="" type="checkbox"/>	promulgated into state water quality standards as biocriteria
	<input checked="" type="checkbox"/>	support of antidegradation
	<input checked="" type="checkbox"/>	evaluation of discharge permit conditions
	<input checked="" type="checkbox"/>	TMDL assessment and monitoring
Applicable monitoring designs	<input type="checkbox"/>	other:
	<input checked="" type="checkbox"/>	targeted (i.e., sites selected for specific purpose) (<i>special projects and specific river basins or watersheds</i>)
	<input checked="" type="checkbox"/>	fixed station (i.e., water quality monitoring stations)
	<input type="checkbox"/>	probabilistic by stream order/catchment area
	<input type="checkbox"/>	probabilistic by ecoregion, or statewide
	<input checked="" type="checkbox"/>	rotating basin
	<input type="checkbox"/>	other:

Stream Miles

Total miles	87,617
<i>(determined using RF3 and the National Hydrography Database)</i>	
Total perennial miles	28,408
Total miles assessed for biology*	245
	stream segments
fully supporting for 305(b)	n/a
partially/non-supporting for 305(b)	n/a
listed for 303(d)	n/a
number of sites sampled (<i>on an annual basis</i>)	~450
number of miles assessed per site	—

*Currently, biological monitoring occurs as either 1) part of intensive watershed survey where water quality problems have been previously identified; 2) part of a site specific survey, wasteload allocation; and 3) most recently as part of expanding ecoregion reference stream data. Biological data are not used to list any 303(d) waters.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Single Aquatic Life Use, Fishery Based Uses and Warm Water vs. Cold Water	
ALU designations in state water quality standards	Two designations: Ecologically sensitive waterbodies protecting endangered, threatened, and endemic aquatic species. Fisheries are divided into Trout, Lakes and Reservoirs, and Streams (further subdivided by ecoregion).	
Narrative Biocriteria in WQS	Procedures used to support narrative biocriteria are currently found in the project specific QAPP. Additional methods and SOPs are being developed. NOTE: The development of criteria and standards is ongoing.	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	<input checked="" type="checkbox"/>	assessment of aquatic resources
	<input checked="" type="checkbox"/>	cause and effect determinations
	<input checked="" type="checkbox"/>	permitted discharges
	<input type="checkbox"/>	monitoring (e.g., improvements after mitigation)
	<input checked="" type="checkbox"/>	watershed based management
Uses of bioassessment/biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	Currently, baseline data has been collected from numerous locations prior to BMP implementation and NPDES limit changes. Follow-up monitoring has occurred at some locations below point sources. No follow-up monitoring has occurred at nonpoint source locations.	

Reference Site/Condition Development

Number of reference sites	75 total	
Reference site determinations	<input checked="" type="checkbox"/>	site-specific
	<input checked="" type="checkbox"/>	paired watersheds
	<input checked="" type="checkbox"/>	regional (aggregate of sites)
	<input checked="" type="checkbox"/>	professional judgment
	<input checked="" type="checkbox"/>	other: upstream/downstream
Reference site criteria	Water quality and habitat is typical of background ecoregion conditions. Watershed is somewhat undisturbed.	
Characterization of reference sites within a regional context	<input checked="" type="checkbox"/>	historical conditions
	<input checked="" type="checkbox"/>	least disturbed sites
	<input type="checkbox"/>	gradient response
	<input checked="" type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Stream stratification within regional reference conditions	<input checked="" type="checkbox"/>	ecoregions (or some aggregate)
	<input type="checkbox"/>	elevation
	<input checked="" type="checkbox"/>	stream type
	<input type="checkbox"/>	multivariate grouping
	<input type="checkbox"/>	jurisdictional (i.e., statewide)
	<input checked="" type="checkbox"/>	other: watershed size, habitat, water quality
Additional information	<input checked="" type="checkbox"/>	reference sites linked to ALU
	<input checked="" type="checkbox"/>	reference sites/condition referenced in water quality standards (found in ADPC&E 1987 - WQ87-06-01 & 02)
	<input checked="" type="checkbox"/>	some reference sites represent acceptable human-induced conditions

Field and Lab Methods

Assemblages assessed	<input checked="" type="checkbox"/>	benthos (<i>100-500 samples/year; single season, multiple sites - watershed level and broad coverage; multiple seasons, multiple sites</i>)
	<input checked="" type="checkbox"/>	fish (<i><100 samples/year; single season, multiple sites - watershed level and broad coverage</i>)
	<input type="checkbox"/>	periphyton
	<input type="checkbox"/>	other:
Benthos		
sampling gear		D-frame; 200-400 micron mesh
habitat selection		riffle/run (cobble), multihabitat and woody debris
subsample size		100 count
taxonomy		combination - family, genus and species
Fish		
sampling gear		backpack and boat electrofisher, pram unit (tote barge) and seine; 3/16" and 1/4" mesh
habitat selection		pool/glide, riffle/run (cobble), and multihabitat
sample processing		anomalies
subsample		whole samples are sorted and identified to species
taxonomy		species and life stage
Habitat assessments		
		visual based with limited quantitative measurements and hydrogeomorphology, pebble counts, flows and canopy cover; performed with bioassessments
Quality assurance program elements		
		quality assurance plan, periodic meetings and training for biologists, sorting and taxonomic proficiency checks, specimen archival, and standard operating procedures (in development stage)

Data Analysis and Interpretation

Data analysis tools and methods	<input checked="" type="checkbox"/>	summary tables, illustrative graphs
	<input type="checkbox"/>	parametric ANOVAs
	<input checked="" type="checkbox"/>	multivariate analysis
	<input checked="" type="checkbox"/>	biological metrics (<i>aggregate metrics into an index and return single metrics - use endpoint for each single metric</i>)
	<input checked="" type="checkbox"/>	disturbance gradients
	<input type="checkbox"/>	other:
Multimetric thresholds		
transforming metrics into unitless scores		As a percent of either the reference site or based on ecoregion data dependent upon standard deviation units
defining impairment in a multimetric index		As a percent of either the reference site or based on ecoregion data dependent upon standard deviation units
Multivariate thresholds		
defining impairment in a multivariate index		As a percent of either the reference site or based on ecoregion data dependant upon standard deviation units
Evaluation of performance characteristics <i>Not currently evaluated</i>	<input type="checkbox"/>	repeat sampling
	<input type="checkbox"/>	precision
	<input type="checkbox"/>	sensitivity
	<input type="checkbox"/>	bias
	<input type="checkbox"/>	accuracy
Biological data		
Storage		Microsoft databases
Retrieval and analysis		none